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INPUT-OUTPUT TECHNICS IN PORTUGAL

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" INPUT - OUTPUT TECHNIQUES IN PORTUGAL "

by
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1 - The National Institute for Industrial Research and the Association of Portuguese Industries have been working in close collaboration in drawing up the first Portuguese Input-Output table with reference to the year 1959.

The present communication aims at giving a provisional description of this work with especial emphasis on the problems of method which arose and on the types of solutions which were adopted.

A brief reference will be made, at the outset, to the objectives sought, followed up with a description of the main characteristics of the Portuguese tables. Next, the problems of statistical sources and methods will be considered together with the solutions given to those problems. Finally, attention will be paid to the utilisation and development envisaged in regard to the Input-Output table in Portugal.

Objectives:

2 - Although the Leontief method and input-output analysis have been known and studied in Portugal for many years, the idea of drawing up an input-output table began to take shape in view of the exigencies of planning and, more precisely, as a critique of the methods of drawing up the Second Development Plan (1959-1964).

In fact, in Portugal as in other countries, the statistical application of input-output methods arises from the necessity of gathering the data considered indispensable for programming sectoral economic development. More concretely: the first Portuguese table aims initially at prepare the next Development Plan (covering, in principle, the period 1965-1970).

It is natural, therefore, for all the work of empirical quantification to be influenced by this particular aim of application, particularly as regards the structure of the table and the sources and methods adopted.

Brief description of the Table:

3 - The present Table refers, as already stated, to the year 1959 and to the territory of continental Portugal. As regards the other Portuguese territories, since these are geographically separated from the former, it became necessary to exclude them from the analysis, even because they should be studied in the light of the considerations of Profs. Peacock and Dosser on the priority to be given to the estimate of national income and to the preparation of sectoral accounts of the activities for which better statistical data are available. As regards the choice

of the basic year, the fundamental reason is that a district-wise Industrial Survey was carried out between the years 1957 and 1959, the main Industrial districts (1) having been studied in 1959 and the respective data published towards the end of 1960.

The characteristics of the Portuguese Input-Output table reflect, as has already been said, the purpose of applying it to the study of the projections of the Portuguese economic structure, particularly in the field of industry. Hence the special attention paid to the industrial sectors and to external trade, the transactions with the Portuguese overseas territories being studied separately.

The Table shows 40 sectors, 27 of which are related to secondary activities (mining, manufacturing and building industries). On the other hand, the primary sectors are studied with a detail surpassing that of many tables drawn up in other countries (4 sectors for crops, 1 for live-stock farming, 1 for fisheries and 1 for forest-products). However, this part of the work drew relatively little attention inasmuch as it had small bearing on the industrial sectors and on external trade.

In relation to external trade, care was taken to study important export activities under special sectors, such as wines (sector 4), canned fish (10), cotton fabrics (14), cork (17), paste and paper (18). Side by side and with a view to differentiating the imports originating from the Portuguese overseas territories, two fictitious sectors were detailed for agricultural and forest products, one of these including an important part of those products and the other including products considered as competing with those of Continental Portugal.

The following may be pointed out as the other characteristics of the Portuguese Table: it is a square Table, in which the flutuations are recorded on the basis of the producer's price and the imports figure alongside the internal production considered as a component of the total resources of each sector, excepting the produts from Overseas Portugal and, in general, the tropical products. As regards the secondary products, the solution adopted is analogous to that of the Japanese Table for 1951 although an exception has been made in some cases in which an important part of the main material is found associated, for economic reasons, with the main products of the sector (e. g. the extraction of clay , sand or Kaolin used in cement and ceramic industries).

Statistical sources and methods:

4 - Owing to the limits set down for this communication, it is not possible to go into a complete analysis of the sources and methods utilised in drawing up the Portuguese Table. It will, however, be useful to describe the more important aspects in order to enable an appreciation of the reliability of the estimates.

The first point which needs to be stressed is the importance attributed to the sources relating to the industrial sectors, which as already pointed out, were a decisive factor in the choice of the basic year for the Table.

In fact, in the years 1957 to 1959, the National Institute of Statistics (I. N.E.) carried out a survey with a view to obtaining as complete information as possible regarding the industrial structure of various districts in Continental Portugal, the most important districts having been investigated in 1959, as already stated.

This survey took a establishment as the basic unit and included various classes of I.S.I.C. (in a few cases, groups (2)) corresponding to the mining, manufacturing and building industries and even to the sectors of electricity, gas and steam. As regards the elements of survey, there are, among others which need not be mentioned here, data for each of the abovementioned classes (and groups) in respect of the value of production and of the expenditure over raw material (total

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(1) Lisbon and Oporto. Besides these, inquiries were conducted in 1959 also in two out of the three other districts of industrial importance.

(2) That is, although the results published by I.N.E. refer to the classes of I.S.I.C., groups are at times discriminated in case of important activities of the districts surveyed.

amount), electricity and fuel and lubricants.

5 - It was, however, necessary to descriminate the data relating to the "inputs", which could not be obtained in that survey, even by means of an analysis of the distribution of "outputs" (3). This problem was solved differently for each industry or production, although it was sought, in every case, to follow the model international classifications, which became rather easy owing to the fact that the regular Portuguese statistics generally follow the rubrics of those classifications.

Thus, in regard to a certain number of secondary sectors, it was possible not only to establish a comparison with the data of the industrial Survey as also to obtain the most unrelated information. This was achieved chiefly by recourse to the annual statistics of the industry concerned, for such statistics give much more detailed information both as regards production and as regards expenditure on raw materials and sources of energy.

There are, in Portugal, two regular statistics (annual publications), whence it is possible to obtain data relating to the value of production and the expenditure of the various industries. One of these publications (Statistics of Companies), of lesser interest for the elaboration of an Input-Output Table, takes the enterprise with the legal status of a company as the unit and, consequently, does not make any distinction between principal and secondary productions, besides leaving out of account the production of enterprises standing in the name of individuals. Nevertheless, it proved to be useful not only for the purpose of comparing various global data of the industrial survey (4) but especially for working out the data relating to the tertiary sectors, since it is practically the only publication in Portugal, which supplies information regarding those sectors.

The more important of the two publications is undoubtedly the "Industrial Statistics". In fact, the latter has the following characteristics of great interest for the preparation of an Input-Output Table:

a) A more detailed treatment of the secondary sectors, for it includes more than 80 industries, some of them corresponding to the I.S.I.C. subdivision of groups;

b) it takes the establishment as the basic unit, so that all the data refer to this unit;

c) above all, it gives an indication of the principal raw materials and fuels consumed in various industries (in quantities and values), information which is not available in the other statistical publication already refered to.

6 - It can thus be said that, in respect of the secondary sectors, the statistical basis was provided by the Industrial Survey and the "Industrial Statistics", the former for the production values and global data on expenditure and the yatter for the discrimination of "inputs".

Although "The Industrial Statistics" constitute a sort of annual census, given the details it supplies (5), it has the inconvenience of leaving out various important industries, as may be seen from the table given below, where the degree of coverage given by that publication and by "Statistics of Companies" in respect of the big industrial aggregates is examined in the light of the findings of the Industrial Survey.

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(3) This was, however, sought to be done by using the detailed data supplied by I.N.E.

(4) Such comparison became possible owing to the fact that both publications use strictly the rubrics of I.S.I.C. in defining industries and industrial sectors.

(5) This was useful in completing or comparing certain data on cost structure and other matters by reference to the Industrial Statistics published before 1959.

Production Values

(in % of those given by the Industrial Survey)

Industrial Sectors (according to I.S.I.C. classes)	Statistics	
	Industrial	Companies
11 to 19 Minig	64	65
20 to 22 food, beverages and tobacco	61 (1)	82
23 Textile	94	66
24 Clothing and footwear	49	48
25 and 26 Timber and furniture	55	67
27 and 28 Paper, printing, etc.	51 (2)	90
31 and 32 Chemicals and oil products	78	100
33 Mineral products, metal works	73	100
34 Metallurgical products	100	100
35 and 36 Metalo-mechanical products		60
37 Electrical material	31	76
38 Transport material	100	100
29, 30 and 39 Various manufactures	62	100
40 Building		41
11 to 39 Total for Industry	65	90

(1) This deficiency of coverage refers mainly to flour mills and panification.
(2) A gap is seen in the "Industrial Statistics" in relation to printing and publishing enterprises.

It has been found that there are industrial sectors which are insufficiently treated in the Portuguese statistical system, at least in so far as the working out of an Input-Output Table is concerned. This is the case of the metalo-mechanical and electrical industries, basic chemicals and even the sectors of clothing and footwear, timber and furniture, and printing and publishing, the production which is not included representing, in all, about one third of the total industrial production value given by the Industrial Survey.

In order to obviate these gaps, the method of determination of inputs by means of distribution of the volume of the available resources over intermediary utilizations (production + imports + final utilizations) was adopted in relation to certain sectors, such as those of clothing and footwear and of printing and publishing in which certain raw materials are great weight. And it may be stated at once that, both for the qualitative assessment of these inputs and for the distribution just mentioned, some foreign Input-Output Tables were made use of.

7 - But, in order to bridge the gaps in the regular statistical sources, resourse was chiefly had to surveys of the professional organs of the industries concerned and, in the last analysis, of the enterprises themselves such was the method adopted for all or some of the principal industries or productions. included in the metalo-mechanical, electrical, chemical and timber sectors.

This is the stage to stress the importance of the existence or of the non-existence of representative organs of an industry or sector, duly prepared to collaborate in the statistical tasks of the input-output type or other tasks making like demands. Indeed, if lack of official statistics is a serious obstacle in the construction of an Input-Output Table, the situation is considerably worsened if there is no possibility of recourse to entities of the type refered to, whether in the case of private associations or of public bodies having powers to interfere with or control one more of activity.

In respect of the abovementioned sectors and industries, the following entities (or departments) exist in Portugal:

a) in the first place, the specialized sections of the National Institute for Industrial Survey and of the Portuguese Industrial Association, which, as stated at the begining of this paper, are the entities which undertook the ellaboration of the Input-Output Table;

b) The "Grémios" (6) of the metallurgical and metallo-mechanical industries, pharmaceutical products, tailors, footwear makers, tanners, graphic industries, publishers, daily and regional press.

c) The specialized sections of the Corporation (6) of Industry;

d) And, finally, the Committee Regulating Chemical and Pharmaceutical Products, an official body charged with the task of economic coordination (7)

It should be noted, however, that the specialized sections, indicated under a) and c) above, do not have permanent functions and some of the "Grémios", either because they were formed recently or for some other reason, have not shown themselves able to offer the necessary collaboration.

8 - It was, therefore, necessary directly to consult the main enterprises in some of the industries, namely the metallo-mechanical, electrical, clothing and footwear, and timber and furniture, besides certain enterprises in various industrial sectors and in the sectors of building and public works.

It is useful to refer to two aspects of the organization of these surveys, namely the advantage of defining beforehand clearly which are the productions needing to be analysed and what is the most convenient form of discriminating the inputs. This, in any case, is a problem of previous classification. As regeards the first, it is deemed efficacious to take the I.S.I.C. classification as a basis for a detailed classification of the productions. This is found to be compatible not only with the differences in the structure of production which are inevitably to be met with in different countries but also useful from the point of view of international comparison of input-output data. Again,as regards the manner of discriminating inputs, there are many possible solutions in so far as the de tails to be sought or accepted from enterprises are concerned. In Portugal, given the non-existence of a code of commodities which may be easily consulted by the enterprises, recourse was had indistinctly and partly according to circumstances to one of the following three processes:

a) the enterprises were simply asked to give the "main" raw-materials and fuels, leaving them free to indicate the specifications and such details as they thought convenient;

b) they were asked to discriminate the inputs by sectors of origin, according to a very simple list showing the correspondence between the sectors of the Input-Output Table and the main products falling within those sectors.

c) finally, at the request of some of the enterprises which were greatly concerned about secrecy, simple cost structures, in percentages, were accepted,(8).

9 - Going on to the remaining sectors, we shall dwell on the so-called primary sectors (9). Here two the situation is highly unequal as regards the products and the typpes of data.

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(6) The "Grémios)(basic organizations grouping enterprises of the same activity) like the "Corporations" (top organizations having the function of coordinating the interests of a big sector of activity) are bodies falling within the constitutional scheme of the Portuguese Corporative System.

(7) Such a body is a public entity with powers to regulate some economic activities, especially those connected with external trade.

(8) It is good to bear in mind that the elaboration of the Input-Output Table, though partly carried out by a public body, is not patronized by the Government and does not have the power to compel the supply of information and statistical data.

(9) As regards the tertiary sectors, we only wish to stress that, for reasons indicated under 3 above, special attention was paid only to commerce and to transport, more particularly to the former.

The first point to be stressed refers to the regular statistical which consist fundamentally of the "Agricultural Statistics" (10), besides certain data on consumption given by the National Accountancy.

The "Agricultural Statistics" is an annual publication which, among other items of information, gives quantitative data on the main productions of the primary sectors and on some of their inputs. But it suffers from two important lacunae:

a) It gives scant information regarding the quantities and values of certain productions namely in the sector of horticulture and fruits (sector 2 of the Portuguese Input-Output Table), live-stock (sector5) and forestry (sector 6);

b) it gives no information whatsoever on the cost of production.

In order to solve the first of the abovementioned problems, recourse was had fundamentally to certain surveys and estimates which had been published before, relating to the years previous to that of the Input-Output Table, and the corresponding adjustments were then made in respect of each of the productions, normally in function of the variations observed until 1959 in the respective consumption in the country or in the main urban centres. It should be noted, however, that, in spite of the lacunae of the"Agricultural Statistics", it was possible to extract from it, directly, sufficient indications to estimate the value of the production of cereals, wines and oil, and even of some horticultural produts.

Nevertheless, as regards the cost of production, that publication gives information only about the seeds used in the cultivation of cereals but does not give any data of the type of "production account." To overcome this deficiency the fact was admited that the inputs of the primary sectors are almost exclusively utilized in those sectors (11), it being also relatively easy to allocate the inputs to each sector. On the other hand, when it comes to the industrial products almost all of which are to be found in the regularly statistics, it becomes possible indirectly to estimate the quantities and values of those inputs, namely the chemical fertilizers, copper sulphate and other insecticides and pest-killers as well as fodder. At the same time it is now sought to obtain from other economic coordination bodies (12), information which may enable not only to complete the data on inputs as also to compare the allocations and estimates made according to the method mentioned above.

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10) The figures for the external trade of Agricultural products appear in the General publication "Comércio Externo", which collects very detailed annual data on the quantities and values of the exports (F.O.B.) and of imports (C.I.F.).

11) With the exception of fuels and of chemical fertilizers used in the composition of mixed fertilizers. Out the quantities in this case are available in the "Industrial Statistics"

12) Vide footnote (7). These bodies cover, among others, almost all the primary sectors.

10 - In conclusion of this part of the communication, a brief reference may still be made to two points: the use made of the foreign Input-Output Tables and the correlation with National Accountancy. As regards the first point, reference has already been made to the usefulness of foreign Input-Output Tables, especially of countries with an analogous structure and degree of development, for a qualitative definition whether of the types of inputs in a sector or of the various possible intermediary utilizations of a given output. And, if it is not prudent to use internationally a particular technical coefficient, it is not less true that such structure can serve as a basis for working out certain estimates allocations, as it happened in the case of the Portuguese Input-Output Table in respect of the inputs of the agricultural sectors and even of some industrial sectors.

Finally, as regards connection with National Accountancy, we only wish to stress that the Portuguese Input-Output Table, though using some data (and the corresponding methods) taken from that accountancy (13), stands, by the very reason of the lacunae of the Portuguese statistical method and of the possibilities of analysing its international coherence, at a level of a critique of those data and methods, so that no correspondence between the two is to be expected.

Utilization and development envisaged.

11 - Given its origin and characteristics, it is to be expected, as already stated, that the Input-Output Table will be utilized, first and foremost, for studying the prospects of the economic development of Portugal, special attention being paid to industrialization and external trade. It is evident that the ideal practical sphere for such a study is the elaboration of the big lines of sectoral economic policy, which is equivalent, at the moment, to the preparation of the third development Plan (1965 - 1970). Be that as it may, even if the first Portuguese Input-Output Table does not reveal itself sufficiently satisfactory in its efficacy, it will always be worth while as an important critique of the system of economic statistics and will thus be susceptible of progress in this domain, having profound repercussions on the study of Portuguese economy.

12 - As regards the developments which may be envisaged in the field of input-output analysis in Portugal, it is thought that they are partly conditioned by utilizations, since, whether to obtain the support of the enterprises (at least for supplying data) or to secure the patronage of Government bodis, it seems indispensable that the Input-Output Table give evidence of its practical usefulness in questions of economic policy.

In any case, we believe it is legitimate to foresee that, as it happened in other countries, after the elaboration of the first Input-Output Table with all its shortcomings, limitations and restricted aims, other Table or Tables will be worked out with ampher sectoral perspectives and not only with better statistical foundations but with a sufficiency of technical staff, both in quantity and quality (14), so as to carry out efficaciously and speedily a task of such undeniable practical interest in the domain of economic analysis and policy.

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(13) In respect of some primary and tertiary sectors. Regarding data on consumption (public and private) and investment, it was necessary, as a rule, to refer to primary sources or to estimates of a residual type.

(14) In fact, we cannot but stress that, in the case of the Portuguese Input Output Table, time was lost owing to the insufficient staff, which at no time exceeded three persons and, even so, none of them working full time.

SECTORS	I.S.I.C. Standard International Classification of activities (Classes and Groups)
1-Cereals 2-Horticultural products and fruits 3-Wines 4-Oil and Olives 5-Animal products 6-Forest products	01
6-to-1-Agr.-Forest products-Overseas	02
6-to-2-Agr.-Forest products-Foreign	
7-Fisheries	04,Ex 381
8-Mining industries	110,121,122,130,140,190
9-Food	201-203,206-209
10-Preserved fish	204
11-Flour Mills	205
12-Beverages	211-214
13-Woollen textiles	Ex. 231,Ex. 239
14-Cotton and other fibre textiles	231 (except wool and mixed),233, 239 (except tapestry),244
15-Clothing and footwear	232,241 to 243
16-Timber and furniture	250 (except cork),260
17-Cork	Ex 250
18-Paste and paper	271
19-Inorganic chemical products	311 (except explosives and fireworks)
20-Other chemical products	Ex 311,312,319
21-Oiland coal derivatives	321-329
22-Ceramics, glass and cem. products	331-333,339
23-Cement	334
24-Steel	341 (except the first transformation and smelting)
25-Metallurgy of non-ferrous metals	342 (Id.)
26-Pre-transformation of metals	Ex 341, Ex342
27-Metal const. and equipment.	360,Ex370,382
28-Other metal products	350
29-Electrical material	370 (except heavy elect. mat.)
30-Naval construction	381 (except wooden structures)
31-Motorcars	383 (except motocycles and similar)
32-Diverse transport material	Ex 383,385-389
33-Various manufactures	220,272,280,291-292,300,391-399
34-Building and public works	400
35-Electricity	511-513,521-522
36-Commerce	611,612
37-Transport	71
38-Services	384,620,630,(some of those belonging to classes 82,83,84)
39-Scrap	——
40-Undistributed	——

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